REMARKS

Applicants respectfully request reconsideration of the application, as amended, in view of the following remarks and the attached Rule 132 Declaration.

The present invention as set forth in **Claim 1** relates to a moulding composition, comprising:

a plurality of bead polymers dispersed in at least one matrix polymer;

wherein the bead polymers:

have an average particle size of 5 to 40 μm, and

have a refractive index n_D at 20°C which is different from a refractive index n_D at 20°C of said matrix polymer;

and **wherein the bead polymers are prepared by a process**, comprising:

contacting:

at least one polymerizable mix which comprises at least 50% by weight of at least one (meth)acrylate monomer,

at least one aluminum compound, and

an aqueous phase,

to prepare a mixture;

dispersing said mixture at a shear rate ≥ 10^3 s^{-1} to form a dispersion, wherein said dispersion is stabilized by said aluminum compound; and

polymerizing to produce said bead polymers having an average particle size of 5 to 40 μm.

In contrast, Hennig et al fail to disclose or suggest the shearing during the preparation of the bead polymers. The claimed composition is different from Hennig et al because during the preparation of the bead polymers, the reaction mixture is dispersed at **a shear rate of ≥ 10^3 s^{-1}** to form a dispersion. The attached Rule 132 Declaration provides data showing that

the resulting bead polymers are different from and superior to the bead polymers obtained by Hennig et al.

Specifically, the bead polymers of the present invention exhibit a narrow size distribution and a smaller particle size as compared to that which is conventionally obtainable, for example without shearing as in Hennig et al.

As shown by the data that follows, these results are provided by the step: "dispersing said mixture at a shear rate $\geq 10^3$ s^{-1} to form a dispersion, wherein said dispersion is stabilized by said aluminum compound." More particularly, the data below show that the bead polymers having an average particle size within the range of 5-40 μm possess the aforementioned unexpected properties when dispersing the mixture at a shear rate $\geq 10^3$ s^{-1} as compared to a shear rate that is below this claimed range. Specimen pieces with dimensions of 60 x 45 x 3 mm were produced as set forth in Example 1 of the present invention and subjected to measurements. Like specimen pieces were obtained by an analogous procedure and, in this evaluation, the only variable was the shear rate. The resultant bead polymers were analyzed for the particle-size distribution together with standard deviation, transmission, yellowness index, and energy half-value angle. The results are shown in the table below as copied from the Rule 132 Declaration:

	Shear	Shear rate	Stirring	Median value of particle-size distribution per Galai CIS	Standard deviation per Galai CIS	Transmission [%]	Yellowness index	Energy half-value angle β [°]
Example 1 of the present invention	7000 rpm for 15 min	1750 s^{-1}	600 rpm	7.1 μm	2.63 μm	76.3	9.4	22.5
Comparative Example 15453/70	3400 rpm for 15 min	850 s^{-1}	600 rpm	17.6 μm	5.3 μm	87.2	5.16	18.7
Comparative Example 15453/72	without shear	0 s^{-1}	600 rpm	36.2 μm	12.0 μm	89.8	3.19	16.6

From the data above, it is clear that the claimed process provides beads that have a narrow size distribution and a smaller overall particle size. These test results show that the scattering beads prepared by the process of the present invention and compounded into moulding compositions (Example 1 of the present invention) scatter the light very effectively without substantial energy loss (i.e., the energy half-value angle is much poorer when the shear rate is less than $\geq 10^3\ s^{-1}$). Thus, the claimed composition is different from and superior to the compositions of Hennig et al.

Therefore, the rejection of Claims 1, 4-12 and 14-28 under 35 U.S.C. § 102(b) as anticipated by Hennig et al is believed to be unsustainable as the present invention is neither anticipated nor obvious and withdrawal of this rejection is respectfully requested.

The rejections of Claims 1-13 and 15-28 under 35 U.S.C. § 112, first paragraph, and of Claims 1-13 and 15-28 under 35 U.S.C. § 112, 2nd paragraph, are respectfully traversed.

The Examiner states at page 2 of the Office Action: "The term ["matrix polymer"] is not art-recognized for any particular class or grouping of compounds." Applicants disagree. The term matrix polymer is a well recognized term of art as evidenced by the attached page from the Roempp Encyclopedia Chemistry. An English translation is attached as well. It states: "In chemistry, matrix is understood as enveloping material that keeps another substance contained." Polymers are mentioned as examples.

Further, the term "polymer matrix " is used in Hennig et al. See for example the abstract and the claims.

The matrix polymer of the present invention is disclosed to encompass, in a preferred embodiment, polyalkyl (meth)acrylates, polyacrylonitriles, polystyrenes, polyethers, polyesters, polycarbonates and/or polyvinyl chlorides. See specification, page 6, lines 7-9. In addition, it is disclosed at page 12, lines 20-25 of the specification:

> Suitable matrix polymers are any of the thermoplastically processable polymers known for this purpose. These include polyalkyl

> (meth)acrylates, such as polymethyl methacrylate (PMMA), polyacrylonitriles, polystyrenes, polyethers, polyesters, polycarbonates, polyvinyl chlorides. Preference is given here to polyalkyl (meth)acrylates. These polymers may be used individually or else as a mixture, or else may be present in the form of copolymers.

Accordingly, the determination as to "what may be usable in this capacity" would not require an undue burden of experimentation as alleged by the Examiner. Thus, the rejections with regard to the term "matrix polymer" should be withdrawn.

In addition, **new Claim 29** has been added setting forth a Markush group for matrix polymers.

With regard to Claims 17-20 and 25-28, the Examiner argues that: "The claims recite physical properties without any other factors which would enable one having ordinary skill in the art as to what may be embraced by this recitation for use in the invention." Office Action, page 2, last line to page 3, line 2. Applicants disagree.

Claims 17 and 25 set forth that the composition has light diffusion properties. The specification states at page 13, lines 12-13:

> A significant factor for giving the moulding compositions diffusing properties is that the refractive index n_D of the bead polymers at 20°C differs from that of the matrix polymer. This difference between the refractive index of the matrix polymers and the refractive index of the bead polymers is measured for the Na D line (589 nm) at 20°C.

Thus, in view of the description of the specification it is clear that if the molding composition has light diffusing properties, the bead polymers have a refractive index n_D at 20°C which is different from the refractive index n_D at 20°C of the matrix polymer. This limitation is already set forth in Claim 1 on which Claims 17 and 25 depend. Thus, this rejection should be withdrawn.

In addition, new Claim 30 has been added, setting forth how the difference in refractive indices is measured.

Claims 18, 19, 26 and 27 refer to specific standards of how to determine transmittance and Yellowness Index. Applicants attach herewith copies of the German versions of these standards as well as their English translations which explain further details of how the properties are determined based on the standards in the claims. One of skill in the art is clearly enabled to know what is embraced by the claimed physical properties without undue experimentation. Thus, this rejection should be withdrawn.

Claims 20 and 28 set forth the halved-energy angle. The specification at pages 14 and 15 set forth in detail how this property is measured:

> The halved-energy angle (β) is determined using the apparatus depicted in Figure 1:
>
> The test device is composed of a baseplate (1) on which the following components have been mounted as shown in Figure 1:
>
> - He-Ne laser with beam shutter (2)
> - specimen holder (3) at the focus of the
> - condenser lens (4) with diameter 55 mm; f = 39 mm
> - iris diaphragm (5) with max. diameter 60 mm and height-setting device (5a),
> - condenser lens (6) with diameter 55 mm; f = 39 mm focusing onto the
> - photodiode (7)
>
> With no specimen and with the beam shutter for the He-Ne laser (2) open, the laser beam of initial diameter about 1 mm is incident on the centre of each component in the sequence given and on the centre of the photodiode (7). If a transparent, light-scattering specimen is installed, the transmitted proportion of the laser beam is made to diverge to an extent depending on the scattering power of the specimen. The condenser lens (4) then converts the laser beam to a parallel extended beam of not more than 55 mm diameter, which passes unhindered through the fully open iris diaphragm (5) to the second condenser lens (6), which focuses it onto the sensor surface of the photodiode (7). The diode current is indicated by a measuring device and is proportional to the light flux. If the iris diaphragm (5) is slowly closed this then blocks the beam, beginning at the outside, and the indicated current falls. The diaphragm diameter at which half of the initial current is indicated is the halved-energy angle (β).
>
> The equation used to determine this value is:
>
> $$\beta = \arctan \frac{D}{2f}$$
>
> where D = diaphragm diameter in mm at halved current,
> f = focal length of condenser lens = 39 mm.

Thus, it is clear from the specification how the halved-energy angle is measured. One of skill in the art is clearly enabled to know what is embraced by this physical property without undue experimentation. Thus, this rejection should be withdrawn.

Applicants respectfully request that the Examiner acknowledge that the references cited in the **Information Disclosure Statement**, filed in the above-identified application on **May 21, 2003,** have been considered. For the Examiner's convenience a copy of Form PTO **1449 as filed on May 21, 2003**, is attached herewith.

This application presents allowable subject matter, and the Examiner is kindly requested to pass it to issue. Should the Examiner have any questions regarding the claims or otherwise wish to discuss this case, he is kindly invited to contact Applicants' below-signed representative, who would be happy to provide any assistance deemed necessary in speeding this application to allowance.

Respectfully submitted,

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